

FEE TRANSMITTAL for FY 2004

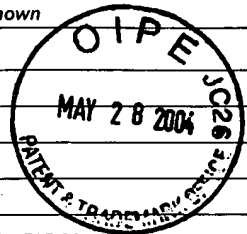
Effective 10/01/2003. Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$) 330

Complete if Known

Application Number 09/855,235
Filing Date May 14, 2001
First Named Inventor HALL et al.
Examiner Name Carol Chaney
Art Unit 1745
Attorney Docket No. PD-990135/11508 (21797-0010)



METHOD OF PAYMENT (check all that apply)

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FEE CALCULATION

1. BASIC FILING FEE

Large Entity		Small Entity		Fee Description	Fee Paid
Fee Code	Fee (\$)	Fee Code	Fee (\$)		
1001	770	2001	385	Utility filing fee	
1002	340	2002	170	Design filing fee	
1003	530	2003	265	Plant filing fee	
1004	770	2004	385	Reissue filing fee	
1005	160	2005	80	Provisional filing fee	

SUBTOTAL (1)

(\$) 0

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

Total Claims	Extra Claims	Fee from below	Fee Paid
-20 **	= 0	X	= 0
Independent Claims	-3 **	= 0	X
Multiple Dependent		X	= 0

Large Entity		Small Entity		Fee Description
Fee Code	Fee (\$)	Fee Code	Fee (\$)	
1202	18	2202	9	Claims in excess of 20
1201	86	2201	43	Independent claims in excess of 3
1203	290	2203	145	Multiple dependent claim, if not paid
1204	86	2204	43	** Reissue independent claims over original patent
1205	18	2205	9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2)

(\$) 0

**or number previously paid, if greater; For Reissues, see above

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity		Small Entity		Fee Description	Fee Paid
Fee Code	Fee (\$)	Fee Code	Fee (\$)		
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet.	
1053	130	1053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	
1252	420	2252	210	Extension for reply within second month	
1253	950	2253	475	Extension for reply within third month	
1254	1,480	2254	740	Extension for reply within fourth month	
1255	2,010	2255	1,005	Extension for reply within fifth month	
1401	330	2401	165	Notice of Appeal	
1402	330	2402	165	Filing a brief in support of an appeal	330
1403	290	2403	145	Request for oral hearing	
1451	1,510	1451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive - unavoidable	
1453	1,330	2453	665	Petition to revive - unintentional	
1501	1,330	2501	665	Utility issue fee (or reissue)	
1502	480	2502	240	Design issue fee	
1503	640	2503	320	Plant issue fee	
1460	130	1460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fee under 37 CFR 1.17 (q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	770	2809	385	Filing a submission after final rejection (37 CFR § 1.129(a))	
1810	770	2810	385	For each additional invention to be examined (37 CFR § 1.129(b))	
1801	770	2801	385	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	

Other fee (specify) _____

*Reduced by Basic Filing Fee Paid

SUBTOTAL (3)

(\$) 330

SUBMITTED BY

Complete (if applicable)

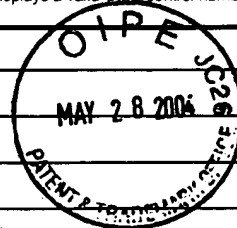
Name (Print/Type) Carmen Santa Maria Registration No. (Attorney/Agent) 33,453 Telephone 717-237-5226
Signature *Carmen Santa Maria* Date May 26, 2004

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TRANSMITTAL FORM (to be used for all correspondence after initial filing)		Application Number	09/855,235
		Filing Date	05/14/2001
		First Named Inventor	HALL et al.
		Art Unit	1745
		Examiner Name	Carol Chaney
Total Number of Pages in This Submission	66	Attorney Docket Number	PD-990135/11508 (21797-0010)



ENCLOSURES (check all that apply)		
<input checked="" type="checkbox"/> Fee Transmittal Form <input type="checkbox"/> Fee Attached <input type="checkbox"/> Amendment / Reply <input type="checkbox"/> After Final <input type="checkbox"/> Affidavits/declaration(s) <input type="checkbox"/> Extension of Time Request <input type="checkbox"/> Express Abandonment Request <input type="checkbox"/> Information Disclosure Statement <input type="checkbox"/> Certified Copy of Priority Document(s) <input type="checkbox"/> Response to Missing Parts/ Incomplete Application <input type="checkbox"/> Response to Missing Parts under 37 CFR 1.52 or 1.53	<input type="checkbox"/> Drawing(s) <input type="checkbox"/> Licensing-related Papers <input type="checkbox"/> Petition <input type="checkbox"/> Petition to Convert to a Provisional Application <input type="checkbox"/> Power of Attorney, Revocation Change of Correspondence Address <input type="checkbox"/> Terminal Disclaimer <input type="checkbox"/> Request for Refund <input type="checkbox"/> CD, Number of CD(s) _____	<input type="checkbox"/> After Allowance Communication to Group <input type="checkbox"/> Appeal Communication to Board of Appeals and Interferences <input checked="" type="checkbox"/> Appeal Communication to Group (Appeal Notice, Brief, Reply Brief) <input type="checkbox"/> Proprietary Information <input type="checkbox"/> Status Letter <input checked="" type="checkbox"/> Other Enclosure(s) (please identify below): Return Acknowledgment Postcard, Certificate of Mailing, Appeal Brief (filed in triplicate)
Remarks		
SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT		
Firm or Individual name	McNees Wallace & Nurick LLC Carmen Santa Maria	
Signature	<i>Carmen Santa Maria</i>	
Date	May 26, 2004	

CERTIFICATE OF TRANSMISSION/MAILING			
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Typed or printed name	Lindsay Vican		
Signature	<i>Lindsay Vican</i>	Date	May 26, 2004

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on May 26, 2004

Date

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Lindsay Vican

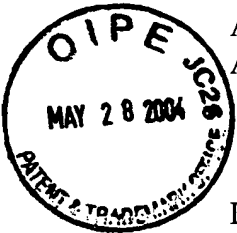
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Appeal Brief (filed in triplicate)

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Attorney Docket No. PD-990135/11508 (21797-0010)
Application No. 09/855,235

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of HALL et al.)	
)	Group Art Unit: 1745
Application No.: 09/855,235)	
)	Examiner: Carol Chaney
Filed: May 14, 2001)	
)	
For: LITHIUM ION BATTERY PASSIVE CHARGE EQUALIZATION		

APPEAL BRIEF

Mail Stop APPEAL BRIEF - PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Applicant files its Appeal Brief in triplicate, together with a Fee Transmittal authorizing the charging of the required fee. A Notice of Appeal and fee were previously filed.

Real Party in Interest

The Real Party in Interest is the assignee, The Boeing Company.

Related Appeals and Interferences

Applicant is not aware of any related appeals and/or interferences.

06/01/2004 DEMMANU1 00000056 501059 09855235

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Status of Claims

Claims 1-18 were filed. During prosecution, claims 1 and 11 were amended, and new claims 19-20 were added. In an Amendment After Final Rejection, claims 7, 9, and 10 were amended (see the following section). Claims 1-20 were finally rejected in the final Office Action of January 2, 2004 ("final Office Action hereinafter") and are appealed.

A clean copy of the appealed claims is found in the Appendix hereto.

Status of Amendments

A Response to Final Rejection was filed, but it had no claim amendments.

During preparation of the Appeal Brief, previously undetected antecedent basis errors were discovered in claims 7, 9, and 10. An Amendment After Final Rejection is filed concurrently with the Appeal Brief, correcting these errors. The copy of the claims in the Appendix includes these amendments to claims 7, 9, and 10, under the assumption that they will be entered.

Summary of Invention

In a lithium metal oxide battery, the individual cells that make up the battery would ideally all perform in an identical fashion. In reality they do not perform in an identical fashion, potentially leading to imbalances when the battery is charged and discharged. The present invention provides an approach to overcoming this balance problem with a passive approach, as distinct from the conventional approach, which requires the use of active circuitry to balance the battery. (Specification, pages 1-2)

In the present approach (claim 12 for example, and illustrated in Figures 1-2), an electrochemical battery 70 comprises at least two electrically interconnected electrochemical cells 20 (Specification, page 7, lines 21-31). Each electrochemical cell

Attorney Docket No. PD-990135/11508 (21797-0010)
Application No. 09/855,235

includes an anode 24 and a cathode 26 comprising a cathode active material, which exhibits a full-discharge cell potential that is more negative than a negative bypass voltage. A cell current bypass 60 is connected between the anode 24 and the cathode 26 of each cell 20. The cell current bypass conducts current between the anode 24 and the cathode 26 to short circuit the electrochemical cell 20 only at voltages more negative than the negative bypass voltage. The cell current bypass is a Schottky diode.

This battery 70 is operated (claim 15) by fully discharging the battery, and thereafter operating the battery in a series of charging and discharging cycles. As illustrated in Figure 3 and described at page 7, line 32-page 8, line 10, this deep discharge, in combination with the structure of the battery described above, produces a balanced battery during subsequent charge/discharge cycles.

Issues

Issue 1. Are claims 1-6, 8, 9, and 12-20 properly rejected under 35 U.S.C. § 103 over Andrieu U.S. Patent 5,543,245 in view of Kewano U.S. Patent 6,193,946?

Issue 2. Are claims 7 and 10 properly rejected under 35 U.S.C. § 103 as unpatentable over Andrieu in view of Kewano as applied to claim 1, and further in view of Okada U.S. Patent 6,027,836?

Issue 3. Are claims 1, 2, 3, 5, 6, 8, 9, and 11-17 properly rejected under 35 U.S.C. § 103 over Andrieu in view of Maeda?

Grouping of Claims

The claims do not stand or fall together, except as stated next.

Under Issue 1, claims 2-6, 8, and 9 stand or fall with claim 1.

Under Issue 1, claim 13 stands or falls with claim 12.

Under Issue 3, claims 2, 3, 5, 6, 8, 9, and 11 stand or fall with claim 1.

Attorney Docket No. PD-990135/11508 (21797-0010)
Application No. 09/855,235

Under Issue 3, claim 13 stands or falls with claim 12.

Arguments for separate patentability of the claims that do not stand or fall together are presented under Argument.

ARGUMENT

Issue 1. Are claims 1-6, 8, 9, and 12-20 properly rejected under 35 U.S.C. § 103 over Andrieu U.S. Patent 5,543,245 in view of Kewano U.S. Patent 6,193,946?

The following principle of law applies to all Section 103 rejections. MPEP 2143.03 provides, “To establish prima facie obviousness of a claimed invention, all claim limitations must be taught or suggested by the prior art. In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). All words in a claim must be considered in judging the patentability of that claim against the prior art. In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).” [Emphasis added.] That is, to have any expectation of rejecting the claims over a single reference or a combination of references, each limitation must be taught somewhere in the applied prior art. If limitations are not found in any of the applied prior art, the rejection cannot stand. In this case, the applied prior art references clearly do not arguably teach some limitations of the claims.

Claim 1 recites in part:

“a Schottky diode connected between the anode and the cathode of the electrochemical cell”.

Claim 15 has a similar recitation.

Neither reference has any such teaching. Andrieu teaches at col. 5, line 66-col. 6, line 3,

“Each cell 32 cooperates with a diode (not shown) protecting it against polarity reversal if the battery 30 is required to supply power during

testing of a cell. This terminates the test in progress. These diodes are Schottky type diodes, for example.” [Emphasis added.]

The diode that is said to be a Schottky diode is explicitly stated to be “not shown” in the drawings. It is therefore not possible to know how the diode is electrically connected to the cell 32. Applicant can find no other mention of the Schottky diode in Andrieu. Some diodes are shown in Figures 3 and 6 of Andrieu, but since they are shown, they are not the Schottky diodes discussed at col. 5, line 66-col. 6, line 3.

Despite the fact that Applicant has raised this straightforward point regarding the disclosure and teaching of Andrieu several times, there has been no response. Both Applicant and the Board will have to await a response in the Examiner’s Answer.

In the Response to Final Rejection, Applicant also noted that the diode symbol in the electrical schematic diagrams of Figures 3, 4, and 6 of Andrieu suggests a conventional diode, not a Schottky diode. With the Response to Final Rejection, Applicant attached and submitted as evidence two Internet downloads and an excerpt from a well-respected semiconductor reference book, all identifying the standard schematic diagram symbols for the standard semiconductor diode and the Schottky diode. These symbols indicate the construction of a circuit element, in the absence of an express statement to the contrary. All of the submitted references point out the difference in structure and performance of a Schottky diode as compared with a conventional semiconductor diode. In short, these references all note that the preferred symbol for a Schottky diode, in the absence of an explicit statement describing the nature of the diode, in a schematic circuit diagram is different from that of a conventional silicon diode.

The Examiner responded in the Advisory Action of April 15, 2004, with an Internet download having a schematic circuit diagram of a 12 volt automotive battery (presumably a lead-acid battery) and its protection. The Examiner asserts that, “Components D1 and D2 are illustrated with a conventional diode symbol in the schematic shown on page 4, and on

page 5 are identified as Schottky diodes in certain embodiments.” On page 4 there is a schematic diagram, and on page 5 there is mention that some of the diodes may be Schottky diodes. This Internet download states that it deals with some embodiments that have conventional diodes and some embodiments that have Schottky diodes. There is no statement that the discussion of page 5 relates to the schematic diagram of page 4, or alternatively whether page 4 is a baseline case provided as a comparative example. The pages of this download are a set of view graphs that would typically be presented with oral commentary, and therefore much of the information required for an understanding of the view graphs is not present.

Up to the point of the Advisory Action of April 15, 2004, the Examiner had relied upon the drawings of Andrieu as disclosing the recited structure. Now having some doubt but wishing to cover all the bases, the Examiner argued in the Advisory Action that “Andrieu discloses ‘a Schottky diode connected between the anode and the cathode of the electrochemical cell’ even if the diode is not illustrated in Figure 5.” The Examiner did not point out where there is such a disclosure of “a Schottky diode connected between the anode and the cathode of the electrochemical cell” in Andrieu. In fact, there simply is no such disclosure.

Claim 12 recites in part:

“a cell current bypass connected between the anode and the cathode, the cell current bypass conducting current between the anode and the cathode to short circuit the electrochemical cell only at voltages more negative than the negative bypass voltage.”

Neither reference has any such teaching. There is no teaching of a negative bypass voltage in either reference, and particularly no teaching of a bypass to short circuit the cell only at voltages more negative than the negative bypass voltage.

Claim 15 further recites in part:

“fully discharging the battery; and thereafter
operating the battery in a series of charging and discharging cycles.”

Neither reference has any such teaching in conjunction with the battery-structure limitations of the claims. This limitation is important because the primary purpose of the present approach is to deal with the problems associated with the balancing of the cells of the battery made of the recited materials and to permit “...a passive charge balancing and equalization of the charge in the individual cells prior to normal charging/discharging cycles, or at intermediate times amidst charging/discharging cycles.” Andrieu is not concerned with this problem at all in lithium metal oxide batteries, and instead is only concerned with monitoring battery aging.

The Office Actions have not addressed claim 15 in relation to this rejection at all. Neither the explanation of the rejection nor any response has argued that this limitation is taught by either reference, or has even mentioned claim 15 and its limitations. Applicant does not know the asserted basis of the Office Action for rejecting claim 15 and its dependent claims in these references, but hopefully Applicant and the Board will learn the Examiner’s position from the Examiner’s Answer.

Kewano deals with lithium cathode materials, but is not concerned with the balancing of cells that are electrically connected together to form a battery or with the characteristics of the modified lithium oxide cathode material that makes balancing of the cells in the battery difficult. Further, to arbitrarily plug teachings from Kewano into Andrieu is not justified and not urged by either reference. The present invention did not arbitrarily choose to use the modified lithium oxide cathode but instead sought to solve a particular problem associated with the use of this material in the cathode. See the discussion in the first paragraph of page 8 of the present application--the full discharge of the recited battery structure results in charge balancing prior to the subsequent charging/discharging cycles. Andrieu teaches the use of either lead-acid batteries or

Attorney Docket No. PD-990135/11508 (21797-0010)
Application No. 09/855,235

nickel-cadmium batteries, and there is no basis to believe that one could substitute a lithium oxide battery having a modified cathode, as recited in the present claims, into the approach of Andrieu.

The present rejection seeks to perform a hindsight reconstruction based upon unrelated references, which is technically unsupported and is legally improper.

Stated in legal terms, the present rejection is a Section 103 combination rejection. It is well established that a proper Section 103 combination rejection requires more than just finding in the references the elements recited in the claim (but which was not done here). To reach a proper teaching of an article or process through a combination of references, there must be stated an objective motivation to combine the teachings of the references, not a hindsight rationalization in light of the disclosure of the specification being examined. MPEP 2143 and 2143.01. See also, for example, In re Fine, 5 USPQ2d 1596, 1598 (at head note 1) (Fed. Cir. 1988), In re Laskowski, 10 USPQ2d 1397, 1398 (Fed. Cir. 1989), W.L. Gore & Associates v. Garlock, Inc., 220 USPQ 303, 311-313 (Fed. Cir., 1983), and Ex parte Levengood, 28 USPQ2d 1300 (Board of Appeals and Interferences, 1993); Ex parte Chicago Rawhide Manufacturing Co., 223 USPQ 351 (Board of Appeals 1984). As stated in In re Fine at 5 USPQ2d 1598:

"The PTO has the burden under section 103 to establish a prima facie case of obviousness. [Citation omitted.] It can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references."

And, at 5 USPQ2d 1600:

"One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention."

Following this authority, the MPEP states that the examiner must provide such an objective basis for combining the teachings of the applied prior art. In constructing such rejections, MPEP 2143.01 provides specific instructions as to what must be shown in order to extract specific teachings from the individual references:

"Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention when there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); In re Jones, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992)."

* * * * *

"The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination." In re Mills, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990)."

* * * * *

"A statement that modifications of the prior art to meet the claimed invention would have been 'well within the ordinary skill of the art at the time the claimed invention was made' because the references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to establish a prima facie case of obviousness without some objective reason to combine the teachings of the references. Ex parte Levengood, 28 USPQ2d 1300 (Bd. Pat. App. & Inter. 1993)."

Here, there is set forth no objective basis for combining the teachings of the references in the manner used by this rejection, selecting the helpful portions from each reference while ignoring the unhelpful portions. An objective basis is one set forth in the art or which can be established by a declaration, not one that can be developed in light of the present disclosure. The rationale set forth in the Office Action is not supported in the art, and there is no reason to believe that the approach of Andrieu is operable with the materials set forth in Kewano.

Andrieu deals with the problem of “excessive aging” in certain types of batteries (col. 2, lines 25-30; col. 8, lines 18-23). There is no mention of a specially modified lithium metal oxide battery. One skilled in the art does not even know whether “excessive aging” of the type described by Andrieu is a problem for lithium metal oxide batteries with modified cathode material as recited in the present claims.

The Examiner’s position, stated in the first paragraph on page 3 of the final Office Action, is to cite some advantages set forth in Kewano and to argue that it would therefore be obvious to substitute the modified-cathode lithium-metal oxide type of battery of Kewano for the battery of Andrieu. Andrieu teaches a system for detecting excessive aging of a battery backup power supply (col. 2, lines 44-47). There is no reason to believe that the approach of Andrieu will be operable with a modified lithium-metal oxide battery as disclosed in Kewano. The purpose of the requirements of the MPEP and the case authority is not to simply state advantages of an unrelated system, but to explain why the overall teachings of the references would suggest that the teachings of one reference may be combined with those of the other reference. That has not been done here.

Claim 14 depends from claim 12 and recites in part: “the cell current bypass comprises a Schottky diode” in the context of claim 12. Neither reference has any such

teaching for the reasons stated earlier in relation to claim 1 and which are incorporated here.

Claim 16 depends from claim 15 and recites in part: “the at least one additional element comprises nickel.” Neither reference has such a teaching in the context of the recitations of claim 15. The Examiner has never pointed out where either reference has such a teaching in the context of claim 15, and Applicant cannot respond further other than to say that no such teaching is present in these references. Hopefully, the Examiner’s Answer will address this claim, so that Applicant can then respond.

Claim 17 recites in part: “the at least one additional element comprises nickel, and the modified lithium metal oxide further comprises cobalt.” Neither reference has such a teaching in the context of the recitations of claim 15. The Examiner has never pointed out where either reference has such a teaching in the context of claim 15, and Applicant cannot respond further other than to say that no such teaching is present in these references. Hopefully, the Examiner’s Answer will address this claim, so that Applicant can then respond.

Claim 18 recites in part: “the at least one additional element comprises nickel and aluminum.” Neither reference has such a teaching in the context of the recitations of claim 15. The Examiner has never pointed out where either reference has such a teaching in the context of claim 15, and Applicant cannot respond further other than to say that no such teaching is present in these references. Hopefully, the Examiner’s Answer will address this claim, so that Applicant can then respond.

Claim 19 recites in part: “the modified lithium metal oxide exhibits a full-discharge cell potential that is more negative than a negative bypass voltage, and wherein the Schottky diode conducts current between the anode and the cathode to short circuit the electrochemical cell only at voltages more negative than the negative bypass

voltage of the electrochemical cell.” Neither reference has such a teaching in the context of the recitations of claim 1. The Examiner has never pointed out where either reference has such a teaching in the context of claim 1, and Applicant cannot respond further other than to say that no such teaching is present in these references. Hopefully, the Examiner’s Answer will address this claim, so that Applicant can then respond.

Claim 20 recites in part: “the step of providing the electrochemical battery includes the steps of providing the modified lithium metal oxide exhibiting a full-discharge cell potential that is more negative than a negative bypass voltage, and providing the Schottky diode that conducts current between the anode and the cathode to short circuit the electrochemical cell only at voltages more negative than the negative bypass voltage.” The Examiner has never pointed out where either reference has such a teaching in the context of claim 15, and Applicant cannot respond further other than to say that no such teaching is present in these references. Hopefully, the Examiner’s Answer will address this claim, so that Applicant can then respond.

Issue 2. Are claims 7 and 10 properly rejected under 35 U.S.C. § 103 as unpatentable over Andrieu in view of Kewano as applied to claim 1, and further in view of Okada U.S. Patent 6,027,836?

Claims 7 and 10 depend from claim 1, and incorporate its limitations. Okada adds nothing in this regard.

Claim 7 recites in part “the separator comprises a layer of microporous polyvinylidene fluoride.” The references have no such teaching in the context of the battery cells having a Schottky diode connected between the anode and the cathode.

Claim 10 recites in part “the anode, the cathode, and the separator are planar and are shaped into a prismatic form.” The references have no such teaching in the context

Attorney Docket No. PD-990135/11508 (21797-0010)
Application No. 09/855,235

of the battery cells having a Schottky diode connected between the anode and the cathode.

Issue 3. Are claims 1, 2, 3, 5, 6, 8, 9, and 11-17 properly rejected under 35 U.S.C. § 103 over Andrieu in view of Maeda?

Applicant incorporates by reference the prior discussion of Andrieu.

Maeda deals with lithium cathode materials, but is not concerned with the balancing of cells that are electrically connected together to form a battery or with the characteristics of the modified lithium oxide cathode material that makes balancing of the cells in the battery difficult. Further, to arbitrarily plug teachings from Maeda into Andrieu is not justified and not urged by either reference. The present invention did not arbitrarily choose to use the modified lithium oxide cathode, which is recited in every claim, but instead sought to solve a particular problem associated with the use of this material in the cathode. See the discussion in the first paragraph of page 8 of the present application--the full discharge of the recited battery structure results in charge balancing prior to the subsequent charging/discharging cycles.

Claim 1 recites in part:

“a Schottky diode connected between the anode and the cathode
of the electrochemical cell.”

Claim 15 has a similar recitation.

Neither reference has any such teaching. Andrieu teaches at col. 5, line 66-col. 6, line 3,

Attorney Docket No. PD-990135/11508 (21797-0010)
Application No. 09/855,235

“Each cell 32 cooperates with a diode (not shown) protecting it against polarity reversal if the battery 30 is required to supply power during testing of a cell. This terminates the test in progress. These diodes are Schottky type diodes, for example.” [Emphasis added.]

The diode that is said to be a Schottky diode is explicitly stated to be “not shown” in the drawings. It is therefore not possible to know how the diode is electrically connected to the cell 32. Applicant can find no other mention of the Schottky diode in Andrieu. Some diodes are shown in Figures 3 and 6 of Andrieu, but since they are shown, they are not the Schottky diodes discussed at col. 5, line 66-col. 6, line 3.

Despite the fact that Applicant has raised this straightforward point regarding the disclosure and teaching of Andrieu several times, the Examiner has made no response. Both Applicant and the Board will have to await a response in the Examiner’s Answer.

In the Response to Final Rejection, Applicant also noted that the diode symbol in the electrical schematic diagrams of Figures 3, 4, and 6 of Andrieu is indicated as a conventional diode, not a Schottky diode. See the discussion presented above under Issue 1, and which is incorporated here.

Claim 12 recites in part:

“a cell current bypass connected between the anode and the cathode, the cell current bypass conducting current between the anode and the cathode to short circuit the electrochemical cell only at voltages more negative than the negative bypass voltage.”

Neither reference has any such teaching. There is no teaching of a negative bypass voltage in either reference, and particularly no teaching of a bypass to short circuit the cell only at voltages more negative than the negative bypass voltage.

Claim 15 further recites in part:

“fully discharging the battery; and thereafter
operating the battery in a series of charging and discharging cycles.”

Neither reference has any such teaching in conjunction with the other limitations of the claims. This limitation is important because the primary purpose of the present approach is to deal with the problems associated with the balancing of the cells of the battery made of the recited materials and to permit “...a passive charge balancing and equalization of the charge in the individual cells prior to normal charging/discharging cycles, or at intermediate times amidst charging/discharging cycles.” Andrieu is not concerned with this problem at all in specific types of modified-cathode lithium metal oxide batteries, and instead is only concerned with monitoring battery aging.

The Office Actions have not addressed claim 15 in relation to this rejection at all. Neither the explanation of the rejection nor any response has argued that this limitation is taught by either reference, or has even mentioned claim 15 and its limitations. Applicant does not know the asserted basis of the Office Action for rejecting claim 15 and its dependent claims in these references, but hopefully Applicant and the Board will learn the Examiner’s position from the Examiner’s Answer.

The present rejection seeks to perform a hindsight reconstruction based upon unrelated references, which is technically unsupported and is legally improper. Applicant incorporates the prior discussion of the legal requirements for a Section 103 rejection.

The Office Action of August 4, 2003, addresses this requirement at page 5, lines 2-6. It is asserted that because Maeda teaches a method to suppress temperature rises in lithium metal-oxide batteries, it would be obvious to substitute the modified-cathode lithium metal-oxide batteries for the lead-acid or nickel-cadmium batteries of Andrieu. Maeda's approach is specific to certain lithium metal-oxide batteries, having to do with electrode materials of construction of specific entropy-change types. There is utterly no basis for asserting that this approach of Maeda has anything at all to do with the batteries as taught by Andrieu, and it certainly does not suggest that it would be obvious to replace the batteries of Andrieu with a modified-cathode lithium metal-oxide battery of Maeda.

Claim 14 depends from claim 12 and recites in part: "the cell current bypass comprises a Schottky diode" in the context of claim 12. Neither reference has any such teaching.

Claim 16 depends from claim 15 and recites in part: "the at least one additional element comprises nickel." Neither reference has such a teaching in the context of the recitations of claim 15. The Examiner has never pointed out where either reference has such a teaching in the context of claim 15, and Applicant cannot respond further other than to say that no such teaching is present in these references. Hopefully, the Examiner's Answer will address this claim, so that Applicant can then respond.

Claim 17 recites in part: the at least one additional element comprises nickel, and the modified lithium metal oxide further comprises cobalt." Neither reference has such a teaching in the context of the recitations of claim 15. The Examiner has never pointed out where either reference has such a teaching in the context of claim 15, and Applicant cannot respond further other than to say that no such teaching is present in these references. Hopefully, the Examiner's Answer will address this claim, so that Applicant can then respond.

Attorney Docket No. PD-990135/11508 (21797-0010)
Application No. 09/855,235

SUMMARY AND CONCLUSIONS

Applicant asks that the Board reverse the rejections.

As demonstrated, none of the references teach the “Schottky diode connected between the anode and the cathode of the electrochemical cell” limitation of claims 1 and 15, the “a cell current bypass connected between the anode and the cathode, the cell current bypass conducting current between the anode and the cathode to short circuit the electrochemical cell only at voltages more negative than the negative bypass voltage” limitation of claim 12, and the “fully discharging the battery; and thereafter operating the battery in a series of charging and discharging cycles” limitation of claim 15. Other limitations are not taught as well.

Further, there is no basis for combining the teachings of the references. The rejections are hindsight reconstructions. The Commissioner is hereby authorized to charge any additional fees and credit any overpayments to Deposit Account No. 50-1059.

Respectfully submitted,
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APPENDIX
Clean Copy of Appealed Claims

1. An electrochemical battery comprising at least two electrically interconnected electrochemical cells, each electrochemical cell comprising:
 - an anode comprising carbon;
 - a cathode comprising a modified lithium metal oxide including at least one additional element selected from the group consisting of nickel, aluminum, magnesium, titanium, and combinations thereof; and
 - a Schottky diode connected between the anode and the cathode of the electrochemical cell.
2. The battery of claim 1, wherein the at least one additional element comprises nickel.
3. The battery of claim 1, wherein the at least one additional element comprises nickel, and the modified lithium metal oxide further comprises cobalt.
4. The battery of claim 1, wherein the at least one additional element comprises nickel and aluminum.
5. The battery of claim 1, wherein the anode comprises
 - a copper anode current collector, and
 - carbon particles supported on the anode current collector.
6. The battery of claim 1, wherein the cathode comprises
 - an aluminum cathode current collector, and
 - modified lithium metal oxide particles supported on the cathode current collector.

7. The battery of claim 1, further including a separator disposed between the anode and the cathode, wherein the separator comprises
a layer of microporous polyvinylidene fluoride.

8. The battery of claim 1, wherein the electrolyte comprises a mixture of an electrically conductive lithium salt and an organic carbonate.

9. The battery of claim 1, further including a separator disposed between the anode and the cathode, wherein
the anode, the cathode, and the separator are planar and are rolled into a spiral.

10. The battery of claim 1, further including a separator disposed between the anode and the cathode, wherein
the anode, the cathode, and the separator are planar and are shaped into a prismatic form.

11. The battery of claim 1, wherein the modified lithium metal oxide comprises a combination of materials selected from the group consisting of lithium nickel oxide, lithium nickel aluminum oxide, lithium nickel cobalt oxide, lithium nickel cobalt oxy-fluoride, lithium nickel cobalt aluminum oxide, lithium nickel cobalt iron oxide, lithium nickel cobalt manganese oxide, lithium nickel cobalt manganese aluminum oxide, and lithium nickel cobalt titanium magnesium oxide, and combinations thereof.

12. An electrochemical battery comprising at least two electrically interconnected electrochemical cells, each electrochemical cell comprising:
an anode;
a cathode comprising a cathode active material which exhibits a full-discharge cell potential that is more negative than a negative bypass voltage; and

a cell current bypass connected between the anode and the cathode, the cell current bypass conducting current between the anode and the cathode to short circuit the electrochemical cell only at voltages more negative than the negative bypass voltage.

13. The battery of claim 12, wherein the cathode active material comprises a modified lithium metal oxide including at least one additional element selected from the group consisting of nickel, aluminum, magnesium, titanium, and combinations thereof.

14. The battery of claim 12, wherein the cell current bypass comprises a Schottky diode.

15. A method of operating a battery system, comprising the steps of providing an electrochemical battery comprising at least two electrically interconnected electrochemical cells, each electrochemical cell comprising:

an anode comprising carbon,

a cathode comprising a modified lithium metal oxide including at least one additional element selected from the group consisting of nickel, aluminum, magnesium, titanium, and combinations thereof, and

a Schottky diode connected between the anode and the cathode;
fully discharging the battery; and thereafter
operating the battery in a series of charging and discharging cycles.

16. The method of claim 15, wherein the at least one additional element comprises nickel.

17. The method of claim 15, wherein the at least one additional element comprises nickel, and the modified lithium metal oxide further comprises cobalt.

18. The method of claim 15, wherein the at least one additional element comprises nickel and aluminum.

19. The battery of claim 1, wherein
the modified lithium metal oxide exhibits a full-discharge cell potential that is more negative than a negative bypass voltage, and wherein
the Schottky diode conducts current between the anode and the cathode to short circuit the electrochemical cell only at voltages more negative than the negative bypass voltage of the electrochemical cell.

20. The method of claim 15, wherein the step of providing the electrochemical battery includes the steps of
providing the modified lithium metal oxide exhibiting a full-discharge cell potential that is more negative than a negative bypass voltage, and
providing the Schottky diode that conducts current between the anode and the cathode to short circuit the electrochemical cell only at voltages more negative than the negative bypass voltage.